

Lab6: ID array, Array Pitfalls and Programming

Date: 9-9-2025

Work in a separate directory named **Lab6**. You may use **gedit** & Editor (instead of **vi/nano**).

Task1: Carefully explore the provided *L6_array.c* program. Study each C construct demonstrated in the code, and document in your lab record any constructs or features that are new to you, along with brief notes on your observations.. (10 Points)

Task2: Carefully explore the provided program *L6_arrayPitfalls.c*. Examine each C construct and identify the common pitfalls or tricky behaviors illustrated in the code. In your lab record, document the constructs or features that are new or confusing to you, and include brief notes on your observations about why they may lead to errors or unexpected results.

(10 Points)

Task3: (35 Points)

Read in a number x (double), the number of terms n (int), and k (integer). Print $(k+1)$ values of $\cos(x)$ equally spaced in the range $[0, 2\pi]$, considering up to n terms of the Taylor series for each point using the given expression.

For $k=4$, you need to print for $0\pi, 0.5\pi, 1\pi, 1.5\pi, 2\pi$.

For $n=5$, the expression for $\cos(x)$ is as follows:

$$\cos(x) = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8!$$

Similarly compute $\sin(x)$, then computer $\tan(x)$

Enter a number x (double): 1

Enter the number of terms n (int): 6

Enter the number k (int): 6

theta_0: 1.000000 tan(theta_0): 1.557408

theta_1: 2.047198 tan(theta_1): -1.937764

theta_2: 3.094395 tan(theta_2): -0.046795

theta_3: 4.141593 tan(theta_3): 1.455687

theta_4: 5.188790 tan(theta_4): 5.059551

theta_5: 6.235988 tan(theta_5): 0.602370

theta_6: 7.283185 tan(theta_6): 0.564739

Task 4: . (20 Points)

Write a C program that prints all prime numbers within a given range [A,B].

The program should:

- Prompt the user to enter two integers A and B.
- Ensure that $A \leq B$, use branching to swap their values.
- Use a `for` loop to check the primality of each number in the range.
- Print all the prime numbers between A and B.

For example:

Enter two integers A and B ($A \leq B$): 10 30

Prime numbers between 10 and 30 are: 11 13 17 19 23 29

Eg2:

Enter two integers A and B ($A \leq B$): 50 100

Prime numbers between 50 and 100 are: 53 59 61 67 71 73 79 83 89 97

Task 5: (10 points)

Write a C program to separate the positive and negative integers from a given array into two different arrays.

The program should:

- Prompt the user to enter the size of the array.

- Accept the array elements from the user.
- Store the positive numbers (including zero) in one array and the negative numbers in another.
- Display the contents of the positive array and the negative array separately.

For example:

Enter the size of the array: 7

Enter 7 elements: -5 12 0 -3 8 -9 4

Positive (and zero) elements: 12 0 8 4

Negative elements: -5 -3 -9

Task6: Write a C program to find and display the maximum and minimum elements in an array along with their positions.

The program should:

- Ask the user to enter the size of the array (with a maximum limit of 100).
- Accept the array elements from the user.
- Determine the maximum and minimum values present in the array.
- Display the maximum element and its index, and the minimum element and its index.

(15 Points)

Enter the size of the array: 8

Enter 8 elements: 5 24 5 63 34 0 25 10

Maximum element: 63 at position 3

Minimum element: 0 at position 5

In Record

Task 1 and Task 2

Task 3,4 , 5 and 6: Demonstrate your work to TAs. Submit your code in single file to (roll_number.c file) to

<https://u.pcloud.com/#/puplink?code=J0hXZywG6FhyRQpkzgsJ6CvyoA7dVuU3V>